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## IMPLEMENTATION OF A TEAM-BASED LEARNING COURSE: WORK REQUIRED AND PERCEPTIONS OF THE TEACHING TEAM

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## ABSTRACT

Background: Team-based learning was selected as a strategy to help engage pre-registration undergraduate nursing students in a second-year evidence-informed decision making course.

Objectives: To detail the preparatory work required to deliver a team-based learning course; and to explore the perceptions of the teaching team of their first experience using team-based learning.

Design: Descriptive evaluation.

Methods: Information was extracted from a checklist and process document developed by the course leader to document the work required prior to and during implementation. Members of the teaching team were interviewed by a research assistant at the end of the course using a structured interview schedule to explore perceptions of first time implementation.

Results: There were nine months between the time the decision was made to use team-based learning and the first day of the course. Approximately 60 days were needed to reconfigure the course for team-based learning delivery, develop the knowledge and expertise of the teaching team, and develop and review the resources required for the students and the teaching team. This reduced to around 12 days for the subsequent delivery. Interview data indicated that the teaching team were positive about team-based learning, felt prepared for the course delivery and did not identify any major problems during this first implementation.

Conclusions: Implementation of team-based learning required time and effort to prepare the course materials and the teaching team. The teaching team felt well prepared, were positive about using team-based learning and did not identify any major difficulties.

## INTRODUCTION

To ensure the design of effective health care curricula that prepare undergraduate students for the demands of professional practice, attention needs to be given to the development of critical thinking and reasoning, high level communication, and effective team working. Within nursing curricula, subjects that are research based such as evidence-informed decision making (EIDM) are sometimes not perceived as relevant to nursing by students (Aglen, 2016) and, therefore, it is essential to use teaching and learning strategies that will engage students. One such strategy is team-based learning (TBL) which was developed to help ensure the benefits of small group teaching with large groups (200+) of students. The theoretical basis of TBL is constructivism in which knowledge is viewed as a process structured by personal experiences and social interaction (Hrynychak & Batty, 2012). Chambers et al. emphasised the importance of constructivist pedagogies in enabling students to be more actively engaged in their learning, and the need to move away from teacher-centred approaches (Chambers et al., 2013).

TBL courses are divided into 'learning units' and a specific sequence of activities is followed for each 'unit': (i) out-of-class preparation with clear objectives for the students to work independently, (ii) in-class 'readiness assurance process' that consists of individual and team multiple choice question (MCQ) tests with immediate feedback to check on knowledge gained, and (iii) in-class 'application activities' in which teams work together on problems based on the subject concepts to demonstrate knowledge application (Michaelson & Sweet, 2008). Teams of five to seven students are formed by course leaders diversified as appropriate for the course (e.g. by age, academic achievement), and which are permanent throughout a course. At the end of a TBL course, team members are required to provide feedback on each member's team performance. The emphasis of the teaching team is on facilitation and the use of probing techniques such as dialectical questioning to develop students' knowledge and understanding rather than didactic approaches (Lane, 2008).

Evaluation research has provided insight into the effectiveness of TBL as a teaching and learning strategy. Studies of medical students have demonstrated higher levels of student engagement in TBL courses compared with non-TBL methods (Hunt et al., 2003; Nieder et al., 2005; Zgheib et al., 2011). Higher exam results have been shown with TBL courses (Levine et al.,

2004); and students in the lowest academic quartile have performed better with TBL courses than others (Chung et al., 2009; Koles et al., 2005).

The pedagogical benefits of TBL have been reported in which first year medical students indicated that the TBL activity sequence helped them structure their time, was an effective use of study time and that TBL fostered critical thinking and problem solving more than other teaching strategies they had experienced (Deardorff et al., 2010). Improvements in critical thinking were also evidenced in a study of nursing students using TBL in a second year pathophysiology course (Middleton-Green & Ashelford, 2013). Improved team working was reported in a pre-post study of second year nursing students (Park et al., 2015) adding to the evidence around the lifelong learning skills facilitated by TBL and of particular relevance to health care students where effective team working is essential to achieve high quality care.

Although the evaluation research is largely descriptive, the findings are consistent in demonstrating the effect of TBL on the development of general graduate skills such as critical thinking, professionally relevant skills such as effective team working; as well as pedagogically in preserving the benefits of small group teaching with large groups of students. In no case has there been significant negative experience of using TBL. Guidance is available about how to design and implement a TBL course (Gullo et al., 2015; Parmelee et al., 2012), but comparatively little is available about the overall time and effort required.

The aim of this study is to add to the literature on the implementation of TBL by detailing the work required to prepare a course for delivery using TBL, to explore the perceptions of the teaching team and students, as well as document student results following this first implementation. The course was EIDM delivered to second year, pre-registration nursing undergraduate students in a University in the south west of England. The data relevant to the preparatory work and the perceptions of the teaching team are presented in this paper.

## DESIGN AND METHODS

### Design

A descriptive evaluation was undertaken that involved collecting process data prior to and during the course, and interviews with the teaching team following the end of the course.

### Sample

Eight members of the teaching team of nine (excluding the course leader) who had been part of the total development and implementation process were invited to participate by the research assistant employed for the study. One member of the team had only been able to take part for one of the five facilitated course days and so was not included in the study. All agreed to participate and signed a written consent form. Five were female and three were male, had been teaching in higher education for over 10 years and were experienced in teaching research-related courses to pre-registration nursing students. Seven were registered nurses, four of whom had post-doctoral research experience; and one was a psychologist with post-doctoral research experience.

### Data Collection and Analysis

Two sources were used: data collated by the course leader about the work required to prepare the course for delivery using TBL, and interview data from the teaching team.

#### (i) Work Required Prior to and During Implementation

The course leader developed a checklist of the key tasks and a process document to detail the time and stages of work required prior to and during implementation. This information was shared with a sub-group of the teaching team who helped the course leader with the development and review of the resources and test materials. This documentary information was summarised by the course leader to highlight the work required and the associated timeframe and verified by three members of the teaching team.

## (ii) Teaching Team Interviews

A research assistant undertook individual, structured interviews with the teaching team. Interviews took place on the University campus approximately one month following the end of the course, were audiotaped and lasted about one hour. The course leader developed 17 questions on the basis of the evaluation literature and communication with TBL experts. The questions were reviewed for clarity and comprehensiveness of the TBL process by a member of the professorial team not involved with the delivery of the module, and by the member of the teaching team who was not interviewed. The questions focused on initial thoughts and preparation in advance of the course starting (three questions), facilitation (two questions), what worked and what didn't work well (four questions), contribution to the EIDM course (two questions), and general perceptions about TBL (six questions). An open ended question was included at the end of the interview to give participants an opportunity to add anything not covered by the questions asked. The interview data were first summarised by the research assistant to group quotes from each participant for each of the 17 questions. Similarities and differences between the data were then explored to ensure representation of all views. Finally the data were grouped where the questions addressed similar themes. Verbatim quotes were used to add value to the analysis ensuring all viewpoints were represented.

## Ethics

Ethical committee approval was obtained from the University Faculty Ethics Committee.

## RESULTS

### Work Required Prior to and During Implementation

Nine months were available between the teaching team making the decision to use TBL, and the first day of the course. Development activities and meetings were scheduled during this period to ensure that all work was completed at least one month in advance of the first day of the course. The work was undertaken mainly by the course leader whenever time permitted amongst other teaching-related responsibilities. Analysis of the documentation showed that the work involved two main elements: development of the knowledge and expertise of the teaching team, and development of the resources for the students. This is shown in Table 1 from

which it can be seen that these activities accounted for approximately two-thirds of the total time involved. It should also be noted from the information presented in Table 1 that the time and effort was reduced by about 80% for the subsequent delivery.

INSERT TABLE 1 ABOUT HERE

(i) Team Preparation: The course leader first experienced TBL at a conference, and this experience was further developed following attendance at TBL workshops at the TBL Collaborative conference in the United States, and in England; as well as reading key TBL texts and the TBL evaluation literature. The TBL Collaborative listserv was used to ensure contact with experts during the development process. Lessons learned were cascaded out to the teaching team as were relevant articles and texts which resulted in a degree of confidence as to how the TBL sequence of activities worked.

(ii) Course Development: A teaching team of 10 lecturers supported by two librarians was identified all of whom had previous experience of teaching EIDM and were supportive of the change to TBL. From this team, four formed a sub-group throughout the preparatory period to develop and review all the materials required. The structure of the course, timetabling, student documentation (handbook, induction materials etc.), test questions and application activities were all prepared first by the course leader, reviewed and discussed by the sub-group and then reviewed and confirmed by the remainder of the teaching team. It took a considerable amount of time to develop the multiple choice questions as this way of testing was new to the course leader; and also the application activities which arguably were the most difficult to develop and took the most time. With regard the resources for the preparatory work, we were able to use many of those that had been used previously.

There were four face-to-face meetings scheduled during this nine month period when the sub-group met; and two meetings for the entire teaching team. The course which was initially delivered using a combination of key note lectures and group tutorials was divided into four Units. A total of 257 students were enrolled, divided into five groups each of which was facilitated by two members of the teaching team and then into teams of five to seven students per team. There were a total of 44 student teams across the three nursing disciplines of adult nursing, mental health nursing and child nursing.

The course leader prepared the students during induction sessions in which the rationale for using TBL was made clear and the sequence of activities illustrated. This was reconfirmed on the first day of the course which was also used as a 'practice run' of the TBL process and provided students with the opportunity to meet their team members and establish team ground rules.

### Teaching Team Interviews

Following the analysis process identified earlier, the findings were grouped into five main themes by combining data from questions that addressed similar topics.

#### *Initial Thoughts about TBL and the Preparation Required*

Members of the teaching team referred to previous difficulties associated with students not engaging with the subject material, not undertaking required reading and therefore coming unprepared to sessions; and considered whether TBL would result in more engagement and consequently deeper learning. Whilst all interviewed made positive comments about the idea of using TBL despite none having had previous experience either as student or educator, there was also a degree of apprehension because the strategy was new. It was evident that preparing for the facilitated sessions was central to successful implementation:

*Int. 2: It was exciting, nice to do something different. The module leader was so enthusiastic it was motivating. Also the students sometimes struggle with this topic and so it seemed a good idea to try something new.*

*Int. 6: I was actually quite worried because I didn't understand that TBL was different from things like problem based learning and so on which I had encountered previously...But when I understood what TBL was actually all about I changed my mind and I thought it was a great idea.*

All members of the team prepared for the sessions in some way:

*Int. 4: I made sure I was familiar with the materials, we had the tests in advance and I certainly made sure I had run through the test questions without looking at the answers. ... And if there were any areas that I was uncertain about, I made sure that I did some background reading.*



*Int. 7: I read all the material..sent on TBL. Also read the majority of the student readings. I met with my co-tutor for about an hour.*

One lecturer, however, thought that the method did not involve much work for the teaching team:

*Int. 3: It was all pretty pre-set. It didn't involve a lot of preparation for lecturers. I looked at the questions involved before starting the module. It was a module where I didn't have to do much work. It was all prepared on our behalf.*

### *Facilitating the TBL Sessions*

One of the key features of TBL is that the lecturer acts as both content expert and facilitator. Whilst this is true for most teaching and learning strategies, lecturers would not normally use PowerPoint presentations or other didactic approaches when using TBL, but would rely more on their experience and knowledge for probing the students' level of understanding through dialectical questioning. Most of the lecturers did not find this a problem but did recognise the challenges associated with the shift from imparting information to eliciting information from the students:

*Int. 1: It was okay...It is challenging to keep quiet and not answer the questions. You have to be thinking how to turn the questions around. It is a learning curve.*

### *Positive and Negative Factors Influencing TBL Sessions*

The main factors that resulted in sessions going well were being organised:

*Int. 4: I mean the other things that would contribute towards sessions working well would be preparation on my side, and my colleague's side. We were getting together for an hour's meeting a couple of days before the session and would meet again half an hour or three quarters of an hour before each session started to make sure we were prepared.*

And the students being engaged and prepared to do the necessary work:

*Int. 6: A lot came from the students being willing to engage, to work with their team and their having done the preparatory reading.*

The main influence on sessions not going well was the teaching team's inexperience with TBL and the strategy being new to the students, although the

majority of the team did not feel any sessions had gone badly, more that their facilitation skills improved over time as they got used to the TBL process:

*Int. 7: First couple did not go well because everything was new to the students. There were a number of students, I am not exactly sure how many, but a very 'loud' few, who were being very negative.*

*Int. 8: Because you know the students level of stress is high and you can be affected by it. Also because procedurally the bits had to be in a VERY specific running order and having to deliver the session in a rigid way. There was concern about making a mistake. This got better over time and the second two sessions were better.*

### *TBL and EIDM*

The majority of the teaching team felt that the TBL sequence of activities helped address some of the traditional challenges associated with teaching EIDM such as students not preparing for sessions, and not engaging or applying the concepts learned. The method of individual testing for each Unit was seen as beneficial because it resulted in the students keeping up with the reading and working on their understanding of the concepts ready for each test. The team working process was seen to help those struggling to understand particular concepts; and also give confidence to those who were able to explain concepts to others:

*Int. 2: ...In this method of teaching the students have to use the 'language' themselves from the beginning and so this should result in deeper learning. Also the tests that are used during the course ensure that they are keeping up with the work and should consolidate the learning.*

The preparatory work and team-based discussion was considered to help students familiarise themselves with research jargon with the consequence that it was less threatening and therefore less of a barrier to learning. Furthermore it was believed that through the application activities TBL helped contextualise EIDM in clinical practice, essential if students were to understand the centrality of EIDM to the provision of efficient and effective health care:

*Int. 5: Gets students to think about the material but also how it relates to practice. In some sessions the students were extrapolating their learning to other areas.*

### *General Perceptions of TBL*

The teaching team thought that TBL worked well, primarily as a result of the focused preparatory work and the method of individual and team testing. The preparatory work meant that students had to take responsibility for their learning which as well as helping ensure learning outcomes were achieved, resulted in the students completing all relevant reading by the end of the course, something not previously achieved. All the team emphasised how the strategy ensured that students engaged with the course concepts:

*Int. 2: I think as a learning strategy it is excellent. The students cannot just come in and sit and fall asleep! They have to engage.*

*Int. 5: There was a real buzz in the room so we could tell as facilitators it was going well and when the students were doing the team MCQs they would shout hooray. There was just a sense of engagement, a real buzz.*

The appeal process was viewed positively by the majority of the team, although one member thought it was too much work for the teaching team and of little benefit for the students. There was a mixed response to the application activities with some indicating they worked well and that the students engaged with this element; but three members of the team did not see the benefit of this part of the process. A team review meeting scheduled halfway through the course indicated that this was mostly likely a consequence of the dialectical questioning and facilitation processes not being implemented appropriately with the result that the students were not fully engaged.

Following this first implementation, lessons were learned: preparing for each Unit was seen as key, as was using dialectical questioning to probe students' knowledge and understanding. Working in pairs was seen as advantageous, and having a strong and engaged teaching team was highlighted by one member of the team. Throughout the course, a deeper understanding developed about how TBL was of benefit in developing students' knowledge and lifelong learning skills:

*Int. 1: The main thing is students taking responsibility for their own learning and us passing that responsibility over. It is about setting up the skills they will need to find information themselves! It gives lifelong learning skills.*

*Int. 5: Gets students to think about the material but also how it relates to practice. In some sessions the students were extrapolating their learning to*

*other areas. The other good thing is being responsible as a team member for other members of the team.*

For those new to using TBL, the teaching team highlighted the importance of preparation and following the TBL sequence as described in the literature:

*Int. 1: Read up around TBL, explore the process. Encourage them to shadow someone using the method to learn from them.*

*Int. 3: Read the questions before and know the answers. Anyone can do it. Learn the process by heart, content is easy as it is all there, but follow the process.*

*Int. 6: To be facilitative which is obvious – you are not there to TELL them everything, you are there to encourage them to work in teams, to explain to each other, but if they need something clarified or explained to be prepared to do so. Its being flexible I suppose really.*

As confirmation of their positive view of TBL following this first implementation, all the team recommended that TBL be used elsewhere in the BSc Nursing programme.

## DISCUSSION AND CONCLUSIONS

The aim of this study was to describe the time and work required to prepare a course prior to delivery using TBL, and to explore the perceptions of the teaching team of this first-time implementation. The time required and extent of the preparatory work undertaken by the course leader and how much more developmental effort is associated with TBL compared with other teaching strategies was recognised.

Allowing time for planning was essential: this was our experience and is consistent with that of others (Andersen et al., 2011; Mennenga & Smyer, 2010). The nine months available for planning was optimum for both the development of the teaching team, and identifying, preparing and reviewing the resources and test materials for the students and the teaching team. The information collected during this period suggested it took around 60 days to design and prepare for this first implementation. However, the time taken for preparation for the second delivery was approximately 12 days, 50% of which was attributed to updates to resources. This emphasises the importance of advance planning when considering using TBL so that both the teaching team and students are adequately prepared.

The importance of professional development around TBL was evident. Working with TBL experts, directly and via the listserv, and attending TBL workshops resulted in the course leader becoming more confident with the TBL process and developing appropriate learning resources and test materials. This also enabled a continuous process of development and training for all the teaching team.

The teaching team were positive about TBL for the EIDM course, and identified the potential benefit of TBL elsewhere in the pre-registration nursing programme. Some difficulty was reported in generating inter-team discussion during the application activities, but this reflected a lack of experience with the TBL process, and in particular confidence with dialectical questioning. It was recognised at the teaching team review meetings that continued development of facilitation and dialectical questioning skills was central in ensuring the success of TBL.

As might be expected, increased confidence in the way in which TBL works comes with increased use (Mennenga, 2015), and this was our experience even within this first implementation across the four learning units. As well as being a major change to the teaching and learning strategies previously used with the students, it was also a radical change for the teaching team notably around the absence of any didactic element, as well as the requirement for high level facilitation skills especially dialectical questioning (Lane, 2008).

With regard to using TBL to deliver a course on EIDM, the teaching team observed a degree of enthusiasm and level of engagement amongst the students that had not been experienced with previously used teaching strategies. It was considered that the multiple learning opportunities, both independent and peer, that are embedded in the TBL sequence of activities resulted in greater knowledge and understanding. This increased level of student engagement and enthusiasm has been reported by others (Mennenga, 2013), and has also led to improved course results (Harmon & Hills, 2015).

The main limitation of this study was that a descriptive evaluation design was used, a design that is commonly used in educational research. Whilst some studies have used an experimental design (Thomas & Bowen, 2011) it was not possible logistically for us to develop and deliver two EIDM courses; nor was it possible to be able to guarantee that students would not share or use the resources that would be required for the different delivery methods thus adding a significant confounding factor. To add to the robustness of the design, a research assistant not involved with

the course was employed to collect the interview data; and members of teaching team verified the process data collected by the course leader. The structured interview approach was appropriate for exploring perceptions of the TBL process and worked well; and there was opportunity at the end of the interview for the teaching team to add further information if there were issues that had not been addressed by the individual questions.

In conclusion the teaching team felt that using TBL to deliver the second year pre-registration EIDM course was a success. The time and effort undertaken by the course leader resulted in a well-prepared teaching team, and resources and test materials appropriate for the course. There is a wider application beyond the EIDM course as is evident in the TBL evaluation literature reporting the wide range of subjects in which TBL has been used. Given the challenges in pre-registration nursing courses with increasingly large student cohorts, the sequence of activities associated with TBL offers a teaching and learning strategy acceptable to teaching teams, and one that helps engage students with research-based subjects known to be difficult in terms of student engagement within nursing programmes (Aglen, 2016). As a final comment, the time and effort required for this first TBL implementation was significantly reduced for the subsequent implementation, and the expertise and confidence of the teaching team was considerably greater.

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Table 1: Key Elements of Preparatory Work and Time Required Prior to and During TBL Implementation

Key Element of Work Required	Approximate Time 1 <sup>st</sup> Delivery*	Approximate Time 2 <sup>nd</sup> Delivery
<b>1. Familiarisation with TBL Strategy</b>		
<b>(i) Course Leader</b>		
Attending TBL workshops	2 days	-
Studying TBL texts and evaluation literature	20 days	-
Joining TBL Collaboration and accessing TBL listserv**	As needed	-
Identification/development material to aid preparation of teaching team (e.g. resources from TBL site, 'tutor tips')	1 day	-
<b>(ii) Teaching Team</b>		
Studying key TBL introductory information	1 day	-
Practising TBL process	1 day	-
Mid- and end-course feedback and review	1 day	1 day
<b>2. Course Restructuring for TBL Delivery</b>		
(i) Identification of teaching team	0.5 day	-
(ii) Formation and 4 x meetings of sub-group from teaching team for development and review of student resources	2 days	-
(iii) Reconfiguration of original course into four 'learning units' ready for TBL delivery	0.5 day	-
(iv) Reconfiguration/development learning resources for the student preparatory work	5 days	2 days
(v) Development MCQ questions and application activities for each unit	5 days for each unit	1 day per unit
(vi) Agreement of method of obtaining peer feedback	Via listserv	-
(vii) Determine process for managing team appeals	Via listserv 1 day	1 day 0.5 day
(viii) Formation of student teams using Excel	2 days	
(ix) Preparation of team folders and information for each team folder (making team cards etc.)		
<b>3. Work Required During and Following Course Completion</b>		
(i) Organisation of test materials and inclusion in team folders prior to each unit day	0.5 day in total	0.5
(ii) Processing individual and team test results	0.5 days in total	0.5
(iii) Item analysis to determine quality of MCQ questions for each unit	2 days in total	2 days
<b>4. Preparation of Students</b>		
(i) Preparation and delivery of introduction to TBL for students	0.5 day in total	0.5
(ii) Preparation of course handbook and course intranet site	1 day	0.5

Approximate Total Time	61.5 days	12.5 days
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\*The work undertaken was done over a nine month period.

\*\*The listserv was accessed when needed (e.g. process for obtaining peer feedback, and the method for undertaking item analysis).